

Microstructural evolution upon creep test of Ni based superalloy

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The increasing use of Ni based superalloy as aircraft turbine is expected to continue because of its excellent properties at high temperature and corrosive environment. The high mechanical properties influenced by microstructure and alloying elements can be improved by modifying grain size, volume fraction and distribution of precipitates. Addition of several weight percent of aluminum and titanium helps to form gamma and gamma prime precipitates. Researches showed that lattice parameter and volume fraction of gamma and gamma prime were responsible for the appearance of negative creep during creep test. Hence, microstructural evolution of Ni based superalloy upon creep test has been the focus of investigation.

In this study, creep test was applied to Ni base superalloy disc parts at 650°C under 0.2 %. Crystal structure and phase analyses of Ni based superalloy were performed using X-ray diffraction, optical microscopy, scanning electron microscopy, electron backscattered diffraction, transmission electron microscopy, and energy dispersive spectroscopy. The detailed microstructural evolution of Ni based superalloy will be discussed.